APPENDIX H

Water Quality Monitoring Plan

H.1 INTRODUCTION

This appendix provides an example of a possible long-term water quality monitoring plan (monitoring plan) for the Newfield Greater Monument Butte Oil & Gas Development Project Draft Environmental Impact Statement (DEIS). This is a draft monitoring plan that will be used as a guideline for developing the final monitoring plan which will be finalized prior to completion of the Final EIS with EPA, the State of Utah, and BLM assistance. The monitoring locations shown are only placeholders of potential sampling stations.

H.1.1 Monitoring Objectives

The overall objective of the monitoring plan is to document changes in water quality and quantity that could occur to Greater Monument Butte Project Area (MBPA) streams and water sources (e.g. Pariette Draw, the Green River, groundwater, and springs) over the life of the project (LOP). Monitoring data and reports will be shared with the Utah Division of Oil Gas and Mining (UDOGM), the Utah Division of Water Quality (UDWQ) Groundwater Protection Section, and the UDWQ Watershed Management Section.

To account for uncertainty associated with data available for the Greater Monument Butte DEIS, this monitoring plan is designed to detect any unanticipated impacts to water resources associated with the project. These unanticipated impacts may include:

- Contamination of surface water and/or groundwater by accidental spills of fuels, lubricants, fluid used for hydraulic fracturing, produced petroleum products, evaporation pond fluid leakage to groundwater or surface water, downhole impacts to groundwater or surface water, and leakage from reserve pits
- Increased sedimentation and turbidity of surface waters
- Increased concentrations of selenium, boron, and salinity
- Decreased flows from springs near development areas due to groundwater use by drilling operations
- Changes in groundwater level in water supply wells near development area due to groundwater use by drilling operations

It should be noted that, as disclosed in the Greater Monument Butte DEIS, none of these impacts are expected to occur. Best Management Practices (BMPs) and Applicant-Committed Environmental Protection Measures (ACEPMs) that were incorporated into the analysis should mitigate the potential for impacts to water resources.

H.1.2 Quality Assurance and Sampling Analysis Planning

The first step in the implementation of this monitoring plan will be to develop a comprehensive quality assurance project plan (QAPP), including a comprehensive sampling analysis plan (SAP). Newfield will fund a qualified hydrologist (hereafter referred to as the hydrologist) to develop the QAPP and SAP. The QAPP will be developed using Environmental Protection Agency (EPA) guidance (EPA 2001) and will document the planning, implementation, and assessment procedures for the project, including sampling methods, laboratory procedures, data management and analysis, and reporting. The QAPP will ensure data quality meets the required formats and standards that are required to be incorporated into the current UDWQ database. This step is necessary to ensure that data collected provides reliable detection of impacts to water resources in or downstream of the MBPA. The QAPP will be prepared prior to any

sampling collection, including baseline sampling, prior to commencement of the project. Implementation of this plan will provide information for the BLM to identify, evaluate, document, and monitor direct, indirect, and cumulative impacts to water resources. This plan will also provide the BLM with the tools necessary to determine appropriate response and mitigation measures in the unlikely event of impacts to water resources. The QAPP will be reviewed by the BLM, EPA, and the State of Utah before being approved by the BLM.

Prior to commencement of the Greater Monument Butte project, baseline data will be collected in accordance with the QAPP and SAP for all parameters listed in **Tables H-2**, **H-4**, and **H-6** for surface water, springs, and groundwater, respectively. Data will be collected from appropriate monitoring sites, as described in **Sections H.3.1**, **H.3.2**, and **H.3.3**.

H.2 SUMMARY OF EXISTING WATER QUALITY DATA FOR THE MBPA

The Greater Monument Butte DEIS includes available existing water quality data for surface water and shallow groundwater within the MBPA. Surface water quality data have been collected for some parameters at three locations on Pariette Draw, and the U.S. Geological Survey (USGS) and the State of Utah provide regular monitoring of the Green River upstream from the MBPA. No data are available for ephemeral streams within the MBPA.

The surface water data collected consist of the following parameters:

- **Physical:** pH, alkalinity, temperature, specific conductance, dissolved oxygen (DO), DO saturation, turbidity, salinity, hardness, total dissolved solids [TDS], and total suspended solids [TSS]
- **Nutrients:** Inorganic nitrogen (nitrate plus nitrite), total phosphorus, orthophosphate, ammonia, Kjeldahl-nitrogen, total organic carbon, chemical oxygen demand, and potassium
- **Metals:** Aluminum, barium, cadmium, chromium, calcium, copper, iron, lead, manganese, magnesium, mercury, nickel, selenium, silver, sodium, and zinc
- **Other:** Bicarbonate, boron, arsenic, carbonate, chloride, hydroxide, and sulfate

Analyses of petroleum constituents (e.g., benzene, toluene, ethylbenzene, xylenes, methane, and hydrogen sulfide) have not been previously performed for either surface or groundwater; and therefore, there is currently no existing data to compare to future water quality data. Because there is existing oil and gas development in the area, any anomalies identified in future samples could not be directly related to the Greater Monument Butte EIS project without sufficient baseline samples.

Flow measurements were made at four USGS continuous flow gaging stations located on Pariette Draw in the late 1970s and early 1980s. These include USGS gages 09307200, 09307290, 09307295, and 09307300. More recently, flow was measured on several occasions in conjunction with water quality sampling at the two Utah Storage and Retrieval (STORET) monitoring stations located on Pariette Draw. USGS flow and water quality data is also available at USGS Gage 09272400 at Ouray, Utah.

Groundwater quality data have been collected for one shallow groundwater well (Newfield Well) within the MBPA, located in the Eight Mile Flat area (Section 29, Township 9 South, Range 18 East). The well is approximately 300 feet deep with a depth to groundwater of approximately 75 feet. The data collected are limited to general water quality parameters, including TDS, pH, major cations (calcium, magnesium, sodium), major anions (bicarbonate, sulfate, chloride), several trace metals (iron and manganese), and dissolved gasses (carbon dioxide, hydrogen sulfide).

If available and where pertinent, water quality data collected as part of the Gasco Long-Term Monitoring Plan will be used.

H.3 MONITORING SITE SELECTION, TYPES OF MONITORING AND PROTOCOLS, AND MONITORING FREQUENCY

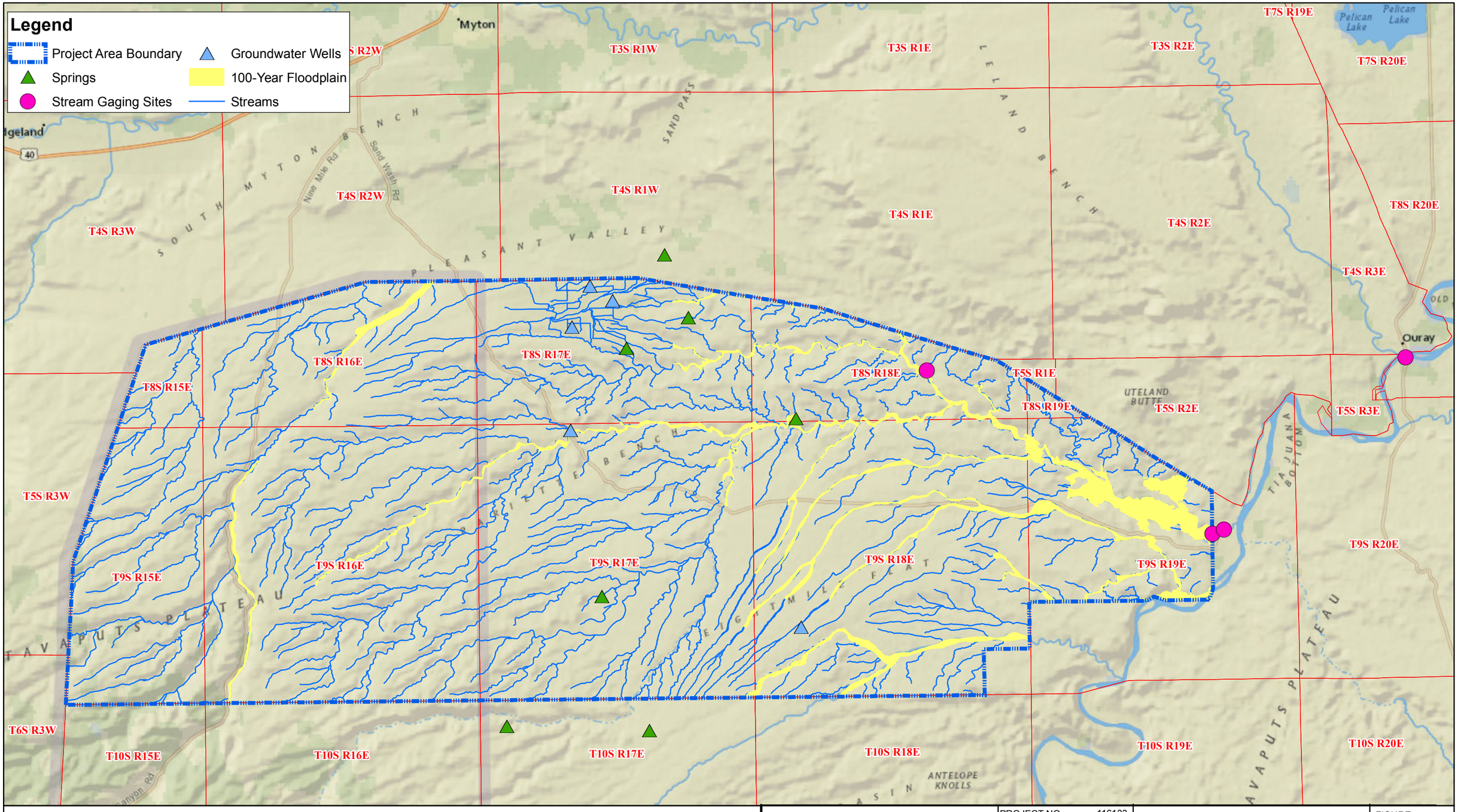
H.3.1Surface Water Monitoring

In addition to the existing data available for the MBPA, at least two but preferably three baseline surface water samples will be collected prior to commencement of the Greater Monument Butte project. The baseline samples will include at least one sample collected under baseflow conditions, as defined in the QAPP. All surface water samples collected during the first year of sampling (including those collected after commencement of the Greater Monument Butte project) will serve as the surface water quality baseline data against which potential impacts will be measured.

Long-term monitoring of surface water quality will be conducted at the four existing Utah STORET surface water quality locations listed in **Table H-1** and shown on **Figure H-1**. Due to difficulties in testing the water quality of dry washes during storm events, a monitoring site on the Green River downstream of STORET 4937020 (downstream of the MBPA) will be used to monitor any changes in water quality in the river below the MBPA.

Table H-1. Long-term Surface Water Quality Monitoring Stations for the Greater Monument Butte Long-term Water Resources Monitoring Plan

Water Body	STORET Number	Station Name
Pariette Draw	4933476	Below flood control (below Castle Peak Draw)
Pariette Draw	4933480	1/3 mile above flood control dam (P 1000)
Pariette Draw	4933440	1 mile above confluence with the Green River (P 2000)
Green River	4937020	Green River near Ouray



0 1.25 2.5 5 Miles

Base Map: ESRI Online Map
Floodplain Data: Utah SGID ArcSDE Database (1995)
Stream Data: Utah SGID ArcSDE Database (2011)
Stream Guage Data: USGS (2004)
Springs Data: Utah SGID ArcSDE Database (2011)
Groundwater Well Data: Utah Division of Water Rights (2004)

N W E S

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PROJECT NO.	116133
DRAWN:	9/24/2013
DRAWN BY:	A.Leonard
CHECKED BY:	J.Habiger
FILE NAME:	Floodplain.mxd

Newfield Exploration Company
Monument Butte EIS

Possible Sampling Locations
for Water Resources Monitoring
Surface and Groundwater

FIGURE
H-1

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At each surface water monitoring site, field parameters will be measured, and a sample will be collected for analysis of the parameters listed in **Table H-2**. For all parameters, the detection limit for each individual analysis will be reported in a database.

Table H-2. Parameters for Long-term Surface Water Monitoring

Field and General Water Quality Parameters	Trace Metals	Other Inorganic Constituents	Organic Constituents
Total alkalinity	Aluminum	Ammonia	Volatile organic compounds (VOCs)[1]
Temperature	Barium	Arsenic	Semi-volatile organic compounds[2]
Specific conductance	Cadmium	Bicarbonate	Radionuclides
pH	Calcium	Boron	Total petroleum hydrocarbons[3]
DO	Chromium	Carbonate	Inorganic nitrogen
DO saturation	Copper	Chloride	Total phosphorus
Turbidity	Iron	Hydroxide	Potassium
Dissolved hardness	Lead	Sulfate	Orthophosphate
TDS	Manganese	–	Kjeldahl-nitrogen
TSS	Magnesium	–	Total organic carbon
Flow	Mercury	–	Chemical oxygen demand
Aquatic habitat	Nickel	–	–
Geomorphology	Selenium	–	–
–	Silver	–	–
–	Sodium	–	–
–	Zinc	–	–

[1] VOCs will be analyzed using EPA Method 8260 or a fully equivalent standard method. Benzene will be analyzed at a detection limit of 1 microgram per liter or lower.

[2] Semi-volatile organic compounds will be analyzed using EPA Method 8270 or a fully equivalent standard method.

[3] Total petroleum hydrocarbons will include, at a minimum, analysis for diesel-range organics and gas-range organics.

Samples will be collected on a quarterly basis (one each in the winter, spring, summer, and fall), and one storm sample per year will be collected at each STORET site and the Green River site downstream of MBPA over the LOP. Storm events will be defined in the QAPP in terms of precipitation and/or flow. Flows at each site will be directly measured at the time each sample is collected. Depending on the magnitude of flow, measurements will be taken using the most appropriate method.

H.3.2 Spring Monitoring

In addition to the existing data available for the MBPA, at least two but preferably three baseline spring water samples will be collected prior to commencement of the Greater Monument Butte project. All spring water samples collected during the first year of sampling (including those collected after

commencement of the Greater Monument Butte project) will serve as the spring water quality baseline data against which potential impacts will be measured.

Long-term monitoring of water quality at selected springs will be conducted at the four springs listed in **Table H-3** and shown on **Figure H-1**. The springs selected are located within the MBPA and have water rights associated with stock watering.

Table H-3. Long-term Spring Monitoring Locations

Spring Name and Number	Location	Water Rights Number
Unnamed Spring	Section 21, Township 9 South, Range 17 East	47-1332
Odekirk Spring	Section 31, Township 8 South, Range 18 East	47-1581
Pleasant Valley Seep	Section 23, Township 8 South, Range 17 East	47-1602
Felter Spring	Section 21, Township 8 South, Range 17 East	47-1439

At each spring monitoring location, field parameters will be measured, flows will be measured, and a sample will be collected for analysis of the parameters listed in **Table H-4**. For all parameters, the detection limit for each individual analysis will be reported in a database. The inclusion of detection limits will allow for the accurate calculation of mean concentrations for parameters with large numbers of non-detect values. Samples will be collected on a quarterly basis (one each in the winter, spring, summer, and fall) at each spring over the LOP.

Flows at spring locations will be measured as near to the spring source as possible; measurement methods will be the same as those described under surface water. If flow is too low for these methods, alternative methods to measure or estimate flow may be considered.

Table H-4. Parameters for Long-term Spring Monitoring

Field and General Water Quality Parameters	Trace Metals	Other Inorganic Constituents	Organic Constituents
Total Alkalinity	Aluminum	Ammonia	Volatile organic compounds (VOCs)[1]
Temperature	Barium	Arsenic	Semi-volatile organic compounds[2]
Specific Conductance	Cadmium	Bicarbonate	Radionuclides
pH	Calcium	Boron	Total petroleum hydrocarbons[3]
DO	Chromium	Carbonate	Inorganic nitrogen
DO saturation	Copper	Chloride	Total phosphorus
Dissolved Hardness	Iron	Hydroxide	Potassium
TDS	Lead	Sulfate	Orthophosphate
Flow	Manganese	–	Kjeldahl-nitrogen

Field and General Water Quality Parameters	Trace Metals	Other Inorganic Constituents	Organic Constituents
TSS	Magnesium	–	Total organic carbon
Turbidity	Mercury	–	Chemical oxygen demand
–	Nickel	–	–
–	Selenium	–	–
–	Silver	–	–
–	Sodium	–	–
–	Zinc	–	–

[1] VOCs will be analyzed using EPA Method 8260 or a fully equivalent standard method. Benzene will be analyzed at a detection limit of 1 microgram per liter or lower.

[2] Semi-volatile organic compounds will be analyzed using EPA Method 8270 or a fully equivalent standard method.

[3] Total petroleum hydrocarbons will include, at a minimum, analysis for diesel-range organics and gas-range organics.

H.3.3 Groundwater Monitoring

In addition to the one existing groundwater sample available for the MBPA, at least two but preferably three baseline groundwater water samples will be collected prior to commencement of the Greater Monument Butte project. The hydrologist will select a monitoring network of wells with adequate spatial coverage to establish baseline groundwater quality and monitor future changes. Detailed monitoring protocols and final well selection will be identified in the QAPP and SAP prior to any drilling or construction of evaporation ponds.

The purpose of the baseline monitoring network will be to 1) establish baseline groundwater quality for the major known aquifers in the area that could be impacted by drilling; 2) establish baseline groundwater quality for any freshwater aquifers and known drinking water sources in the area; and 3) establish monitoring points likely to be down-gradient of major project activities. All groundwater samples collected during the first year of sampling (including those collected after commencement of the Greater Monument Butte project) will serve as the groundwater quality baseline data against which potential impacts will be measured. The following three types of monitoring wells will be considered for selection:

- *Drinking water or stock use wells.* The hydrologist will conduct a search of water rights within the area (via the Utah Division of Water Rights) for any water rights that are used for either drinking water or stock water. These could be wells, springs, or other diversion types. Following the database search, the hydrologist will conduct site visits of the potential monitoring points to verify that there is sufficient access and infrastructure to use the wells for semi-permanent monitoring. If monitoring points appear to be constructed in a manner that will allow for periodic sampling, the landowner will be contacted for permission to sample and for additional details regarding well construction (e.g., depth, screened interval, drilling logs).
- *Existing monitoring well networks.* The hydrologist will conduct a search of water rights in the area to identify any existing monitoring well networks. Following the database search, the hydrologist will contact owners and determine if these wells are accessible, evaluate the possibility of obtaining permission for sampling, and obtain additional construction details.

- *Other non-potable wells.* The hydrologist will identify additional non-potable wells in the area (likely through companies currently conducting oil and gas exploration) by directly contacting other oil and gas operators in the area.

Long-term monitoring of groundwater quality will be conducted at three or four of the five existing wells listed in **Table H-5** and shown on **Figure H-1**. These sites will be selected based on their feasibility for monitoring, distance from one another (sites will represent the subsurface resources throughout the project area), and their utility in providing information about freshwater resources within the MBPA. If access to a sufficient number of wells with good spatial distribution proves infeasible, shallow monitoring wells may be drilled in some areas to monitor potential freshwater resources. Given the programmatic nature of the Proposed Action, it is not possible to know at this time which of the wells listed in **Table H-5** will be hydraulically down-gradient from individual gas production wells or evaporation ponds. During the permitting process for individual project elements, additional site-specific monitoring may be required following selection of specific drilling or evaporation pond locations, or in response to conditions encountered during drilling activities.

There are no delineated freshwater aquifers within the MBPA; however, identification of shallow freshwater aquifers could occur during site-specific drilling or construction of evaporation ponds. Additional monitoring points would be added to the monitoring network on a site-specific basis if freshwater aquifers are discovered during the drilling process. If a freshwater aquifer is encountered during drilling, a search of the nearby area will be conducted to determine if any springs or wells access the same aquifer. If so, these monitoring points will be investigated for accessibility, and permission will be sought to add them to the monitoring network.

During the site-specific permitting processes for evaporation basins, the BLM and UDOGM will require site-specific hydrogeologic information regarding the aquifers present at the site, and they will use this information to determine the appropriate location and depth for monitoring potential impacts. If monitoring wells are required to obtain this information, they will be added to the groundwater monitoring network.

Table H-5. Existing Long-term Shallow Groundwater Monitoring Locations

Name of Water Right Holder	Cadastral Location	Water Right Number and Type	Water Uses	Depth (feet)	Water Quality Data Available?
Newfield Production Company	T9S, R18E, Section 29	Well (47-1820)	Domestic, oil production	200–300	Yes
Inland Production Company	T8S, R17E, Section 21	Well (47-1805)	Unknown	4,990	No
Louis Clark Roberts	T8S, R17E, Section 21	Well (47-1346)	Unknown	Unknown	No
Clark and Arva Abegglen	T8S, R17E, Section 21	Well (47-1501)	Irrigation, Stock, Domestic	Unknown	No
USA Bureau of Land Management	T9S, R17E, Section 4	Well (47-1330)	Unknown	Unknown	No

At each groundwater monitoring location, field parameters will be measured, and a sample will be collected for analysis of the parameters listed in **Table H-6**. For all parameters, the detection limit for

each individual analysis will be reported in the database. The inclusion of detection limits will allow for the accurate calculation of mean concentrations for parameters with large numbers of non-detect values; detection limits are required to be below applicable regulatory water quality standards or as specifically noted in **Table H-6**. Samples will be collected on a quarterly basis (one each in the winter, spring, summer, and fall) at each groundwater monitoring location over the LOP. Because baseline water quality data are limited, sample collection will include at least two rounds of baseline sampling prior to any drilling within the MBPA.

Table H-6. Parameters for Long-term Shallow Groundwater Monitoring

Field and General Water Quality Parameters	Trace Metals	Other Inorganic Constituents	Organic Constituents
Total Alkalinity	Aluminum	Ammonia	Volatile organic compounds (VOCs)[1]
Temperature	Barium	Arsenic	Semi-volatile organic compounds[2]
Specific Conductance	Cadmium	Bicarbonate	Radionuclides
pH	Calcium	Boron	Total petroleum hydrocarbons[3]
DO	Chromium	Carbonate	Methane and isotopes of methane[4]
DO saturation	Copper	Chloride	Full gas chemistry (ethane, propane, butane, pentane, etc.)[4]
Dissolved Hardness	Iron	Hydroxide	Hydrogen sulfide
TDS	Lead	Sulfate	Inorganic nitrogen
TSS	Manganese	–	Total phosphorus
Turbidity	Magnesium	–	Potassium
–	Mercury	–	Orthophosphate
–	Nickel	–	Kjeldahl-nitrogen
–	Selenium	–	Total organic carbon
–	Silver	–	–
–	Sodium	–	Chemical oxygen demand
–	Zinc	–	–

[1] VOCs will be analyzed using EPA Method 8260 or a fully equivalent standard method. Benzene will be analyzed at a detection limit of 1 microgram per liter or lower.

[2] Semi-volatile organic compounds will be analyzed using EPA Method 8270 or a fully equivalent standard method

[3] Total petroleum hydrocarbons will include at a minimum analysis for diesel-range organics and gas-range organics.

[4] Methane will be analyzed at a detection limit of 10 micrograms per liter or lower. If methane is detected above laboratory detection limits; isotopes of methane and full gas chemistry (e.g., methane, ethane, propane, butane, and pentane) will be analyzed.

Static groundwater levels will also be measured at the time of sample collection, prior to any pumping disturbance. Sampling techniques will be specified in the project-specific QAPP prior to data collection.

H.4 REPORTING OBLIGATIONS AND PLAN REVIEW

All water resources monitoring will be conducted under the supervision of a qualified hydrologist. Quarterly monitoring results will be entered into a database and summarized quarterly. Data and quarterly summaries will be delivered to the BLM Vernal Field Office, the UDWQ, and the UDOGM Roosevelt Office. In addition, the hydrologists who are responsible for monitoring activities will prepare an annual monitoring report. At a minimum, this report will contain a description of the monitoring results that identifies by location, observed trends in water quality, any identified potential impacts to water quality, flow conditions, changes in depth to groundwater, recommendations for changes in the long-term monitoring program, and recommendations for mitigation measures to reduce any impacts observed.

The BLM will review the monitoring plan every two years to determine 1) if the plan needs to be changed to adapt to data results; 2) the locations of active project construction; and 3) other project variables. However, these changes should meet the monitoring objectives described in **Section H.1** and defined in the project-specific QAPP. These changes could include relocation, addition, subtraction, or substitutions of monitoring locations or addition or subtraction of monitoring parameters, and an increase or decrease of monitoring frequency if evidence suggests that this is appropriate. All recommended changes, with an explanation for the requested change, will be submitted to the BLM and approved prior to implementation.

In addition to the annual reports, a cumulative assessment of the previous five years of monitoring results will be compiled every five years. A final report will also be completed at the conclusion of the project, which will summarize the entire monitoring program and include a final assessment of all sites monitored throughout the LOP. All monitoring reports will be submitted to the BLM, UDWQ, and UDOGM, and they will be made available to the public upon request.

H.4.1 Source Identification and Mitigation

Monitoring serves to identify the range, intensity, and effects of impacts directly or indirectly related to development. When and if a water resources concern is identified at an established monitoring point, BLM will work with Newfield (and potentially other operators in the area) to conduct an investigation that may include additional monitoring to identify the source of the problem. Water resources concerns associated with the proposed project would include any of the impacts described in **Section H.1**, including the presence of contaminants associated with oil and gas development, changes in water quality associated with surface disturbance, or changes in groundwater levels or stream flows. The QAPP will quantify monitoring "triggers" that will indicate the possible need for more intensive monitoring to identify the source (point or nonpoint) of the concern. At a minimum, these triggers will include drinking water quality standards, where applicable, and/or an established percentage above baseline data. If any of the parameters listed in **Tables H-2**, **H-4**, or **H-6** are found to be above established levels, the BLM, UDWQ, and UDOGM will be immediately notified, and source identification and mitigation measures will be considered by these agencies. The following are additional monitoring and/or mitigation measures that would be considered in the event of an identified impact:

- **Increased Sedimentation**
    - Review BMPs used for road, well pad, and pipeline construction to reduce sediment delivery to area streams.
    - Use additional sediment and erosion controls at well pads and along access roads.

- Identify and increase treatment (paving, stabilizing, or surface treating) to critical portions of roads.
- Relocate proposed well pads, roads, and/or pipelines to avoid erosion-prone areas.

- **Increased Concentrations of Inorganic Constituents, including Metals**
  - Review dust suppression program, including the types of chemical agents used, and modify if necessary.
  - Review BMPs used for road, well pad, and pipeline construction to reduce sediment delivery to area streams and increase implementation levels if necessary.
  - Use additional sediment and erosion controls at well pads and along access roads.
  - Identify and increase treatment (paving, stabilizing, or surface treating) to critical portions of roads.
  - Relocate proposed well pads, roads, and/or pipelines to avoid erosion-prone areas.
  - In cases of increased concentrations of selenium, boron, or TDS, collaborate with UDWQ to determine the source of the increase and whether oil and gas development has contributed to the increase. Implement appropriate BMPs to mitigate the identified source and/or pathway.

- **Contamination with Petroleum and other Organic Constituents**
  - Review the cementing program for well completion, including audits of cement bond records for wells near the impacted streams.
  - Conduct inspections of well pad facilities that may be leaking, including reserve pits, storage tanks, evaporation ponds, aboveground piping, and process units.
  - Require complete remediation of any observed spills or leaks encountered during the well inspections.
  - Review truck loading procedures for produced water and petroleum products.
  - Require compensation to the well owner/water user and disclose the contamination of the impacted well, spring, or surface water to the EPA, and Utah Department of Environmental Quality.
  - Identify and consider potential alternate sources of water (drill new well, haul water from offsite, etc.).

- **Reduction of Spring Flows**
  - Assess whether reduction in spring flow is seasonal fluctuation, due to drought, or the possible result of drilling activities.
  - Identify source area of spring using appropriate methods (e.g., tracer study), when feasible.
  - Review the cementing program for well completion, including review of cement bond logs for wells drilled near the impacted springs.
  - Collect all available historic records concerning pumping history and water levels in nearby water supply wells on spring flows. If feasible, implement continued measurements of pumping rates and water levels in water supply wells.
  - Require compensation be made to users of impacted springs.
  - Implement conservation or water re-use procedures to reduce withdrawals from water supply wells near, or hydrologically connected to impacted springs.
  - Identify and consider potential, alternate sources of water (drill new well, haul water from offsite, etc.).

- **Reduction of Water Levels in Wells**
    - Identify whether the reduced water levels are substantial and affect the availability of water (i.e., below pump intake).
    - Review the cementing program for well completion, including review of cement bond logs for wells drilled near the impacted water sources.
    - Evaluate the effects of water supply wells on existing water sources.
    - Require that compensation be made to users of impacted wells.
    - Implement conservation or water re-use procedures to reduce withdrawals from water supply wells near, or hydrologically connected to impacted wells.
    - Identify and consider potential alternate sources of water (drill new well, haul water from offsite, etc.).

H.5 REFERENCES

U.S. Environmental Protection Agency (EPA). 2001. EPA Requirements for Quality Assurance Project Plans. Available at: http://www.epa.gov/quality/qs-docs/r5-final.pdf. Accessed May 15, 2011.

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